



Investigation of Useability of Composite Filters on Retention of Radium in Natural Waters

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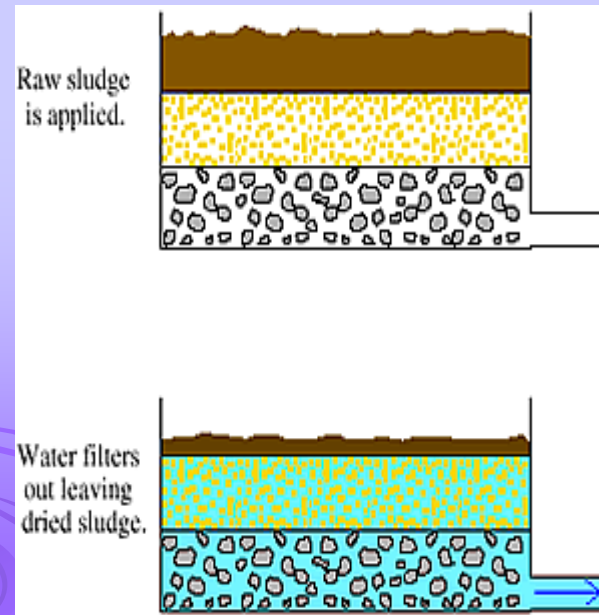
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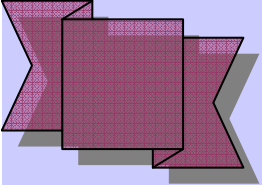
What is the aim of our study?

The aim of this work is to use economic, practical sand filters and to prepare environmental friendly and practically applicable biocomposites/magnetic biocomposites in order to increase efficiency for the removal of radium ions from natural waters.

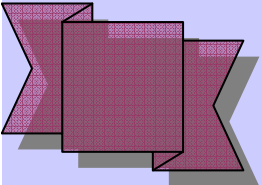


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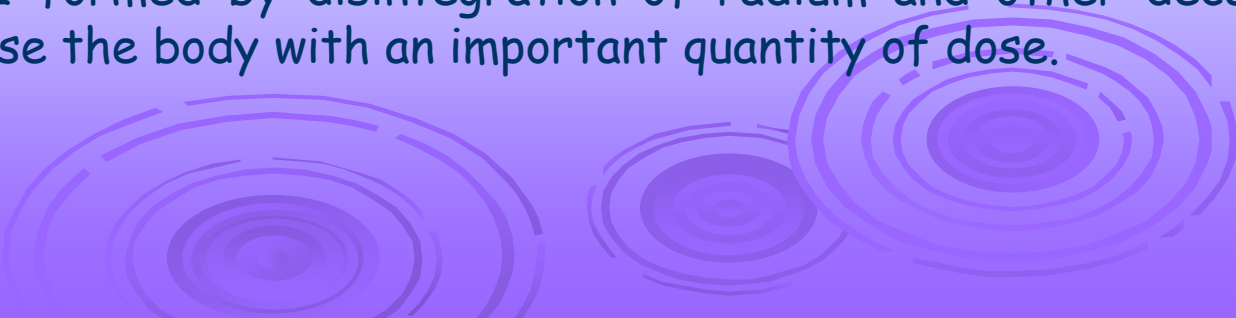
WHY RADIUM?



Radium-226 is a natural radionuclide exposing both environment and all living being to radiation because of its long half-life (1620 y) and radiotoxic effect. Most kinds of waters being used for drinking water and agriculture are provided in underground water. These kinds of waters include dissociated uranium and radium in high concentrates because they transpire towards the surface with washing the underground. That's why radium is of great importance in uranium detection works.

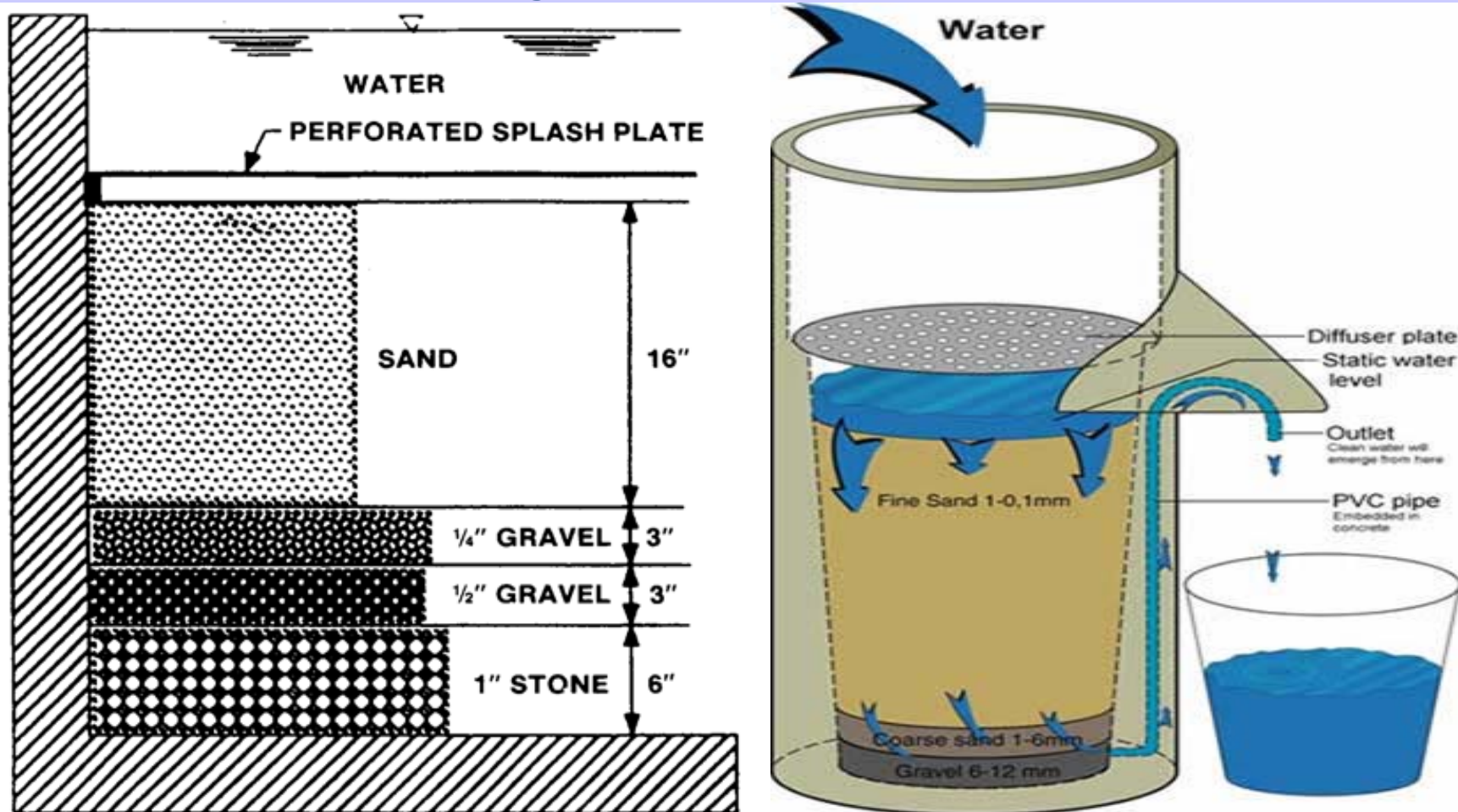


It has a big potential causing a biologic damage as a radiotoxic and long lived alpha source. Radium appearing in the waters is of great significance in terms of internal contamination of human being. Due to its similarity to calcium as chemically, it is stored in bone and bone marrow following the calcium metabolism. Nearly %70-%90 of radium taken by digestion is stored in bones and the rest is stored in soft tissue. Rn-222 formed by disintegration of radium and other decay products expose the body with an important quantity of dose.



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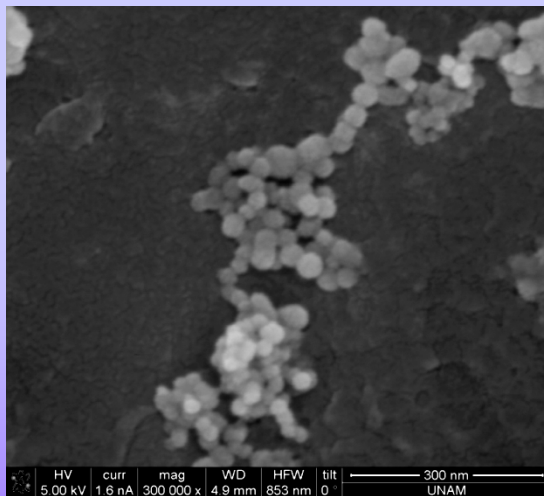
In the present study, the radium removal efficiency was determined within the range of 40 to 60% by different character filter filling materials in previous examinations for removing radium from aquatic solutions. In my master thesis, we tried many kind of filter filling materials. The results showed us that this method is useful but not enough.



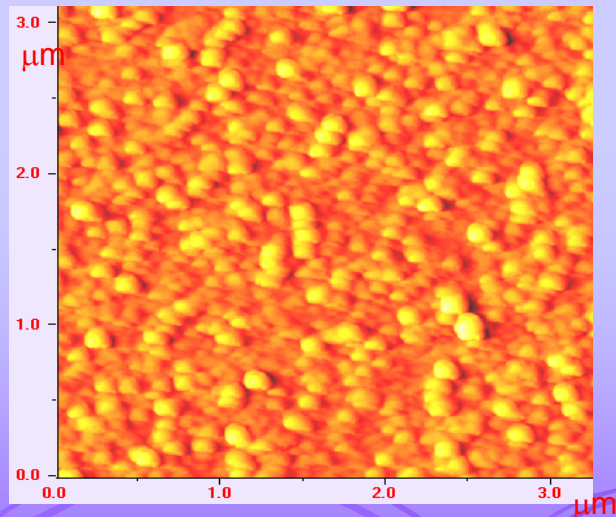
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Because of this reason, we decided to synthesize composite biopolymers in order to increase radium removal efficiency in thermal waters. Firstly, ferric oxide and ferrous oxide nanoparticles will be precipitated and then magnetic nanobiocomposites will be synthesized with chitosan or carregenan biopolymers and magnetic nanoparticles by immobilization into alginate. Also, impacts of experimental conditions in radium's uptake will be investigated. A new application by using prepared nanobiocomposites for the removal of radium in various natural waters will be tested.

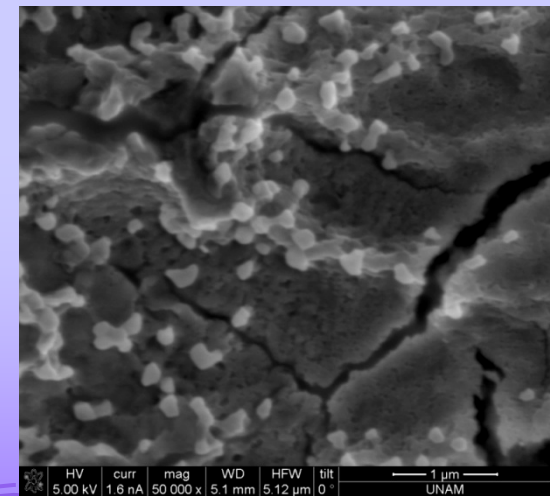
Iron oxide nanoparticles



Chitosan nanoparticles



Iron oxide loaded chitosan nanoparticles



SEM Images of different nanoparticles (<http://www.nanott.hacettepe.edu.tr>)

And Advantages!!!!

- High specific surface area
- Ease of useability
- Non-toxicity
- Biocompatibility
- Biodegradation
- Effective and easy separation by magnetic field
- Ease of synthesis and flexibility in processing
- Most of magnetic biocomposites show superparamagnetic behavior at small sizes



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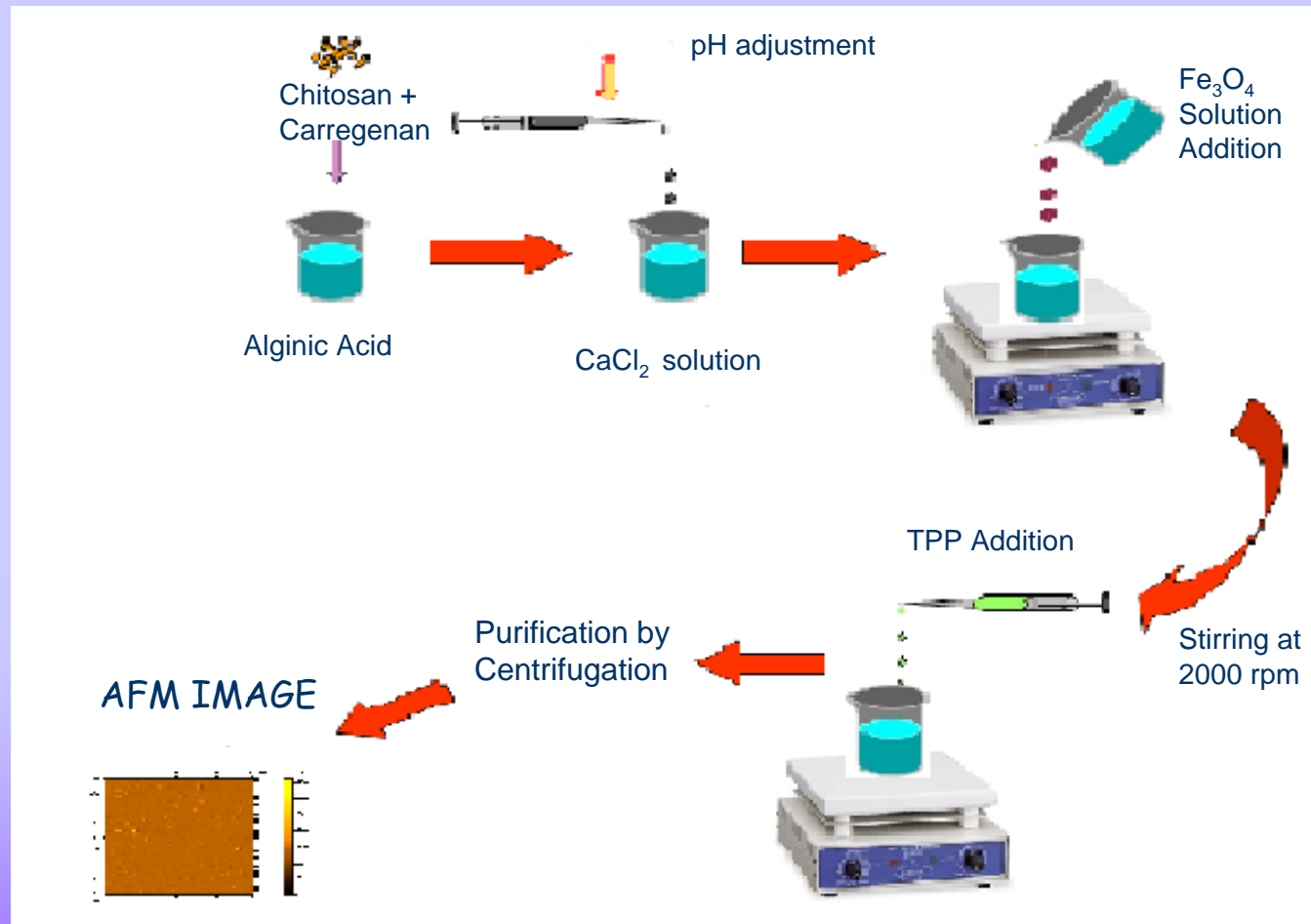
SYNTHESIZE METHODS

- ❖ Chemical co-precipitation process (*Wang et al., 2009*)
- ❖ Sol-gel self-propagation (*Yang et al., 2008*)
- ❖ In the tiny pools of water-in-oil micro-emulsion (*Wang et al., 2008*)
- ❖ Ferrous salt as micro-reactors by adding the basic precipitant of NaOH into the micro-emulsion (*Zhi et al., 2006; Wang et al., 2003*)
- ❖ Organic vapor condensation
- ❖ Polymer coating
- ❖ Surfactant adsorption
- ❖ Direct silanation (*Takafuji et al., 2004*)



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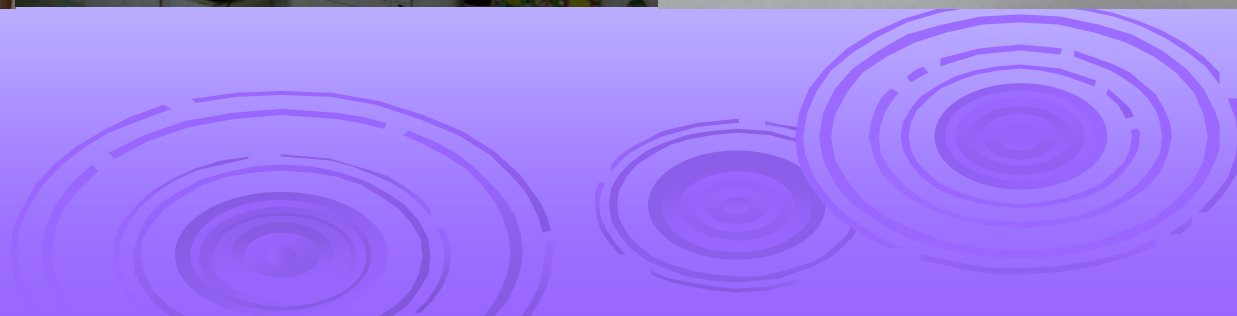
Preparation of Nanobiocomposites



Preparation of Magnetic Chitosan Nanoparticles (KAVAZ D., "MAGNETIC NANOPARTICLES FOR PATHOGEN DETECTION", NATO-ASI, Moldova, June 7th-17th 2010)

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In our other study, we synthesized micro alginate biopolymer beads for uranium uptake in aqueous solution and the adsorption yield for uranium ions were determined more than 90% under the optimized experimental conditions. As a result of pre-experimental studies with different kind of sand filling materials, radium removal efficiency has better performance and also it is expected that it would be effective, environmental, cheap and practical method by the preparation of novel nanobiocomposites for removal of radium.



Love your environment



...be proud of it.

A night photograph of a city skyline reflected in water. The city lights are bright and colorful, reflecting on the calm water surface. In the foreground, there are fireworks exploding, creating a burst of light and color. The overall scene is festive and celebratory.

THANK YOU
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